

REMARKS

Claims 1, 3 and 4 are pending in the application. Claim 1 is amended herein. Support for the amendment is found, for example, on page 24, lines 20-21 and page 32, lines 8-10 of the specification. Hence no new matter is presented.

I. Response to Rejections under 35 U.S.C. § 103

Claims 1 and 3-4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Morii et al '378. The Examiner takes the position that the Amendment and Declaration under 37 C.F.R. § 1.132 previously submitted on November 8, 2004 (the executed version was submitted on December 3, 2003), are not persuasive. Specifically, the Examiner did not find the Declaration to be commensurate in scope with the coverage sought.

Claims 1 and 3-4 are rejected under 35 U.S.C. §103(a) as being unpatentable over Morii et al '378, further in view of Van Geert et al WO 00/35662 and Smothers et al '283.

Applicants respectfully traverse the rejections and submit that the present claims are not rendered obvious by the cited references.

The present claims are amended to recite that the adhesive agent is dissolved or dispersed in water thereby further clarifying the claimed invention.

Further, Applicants submit a new Declaration which establishes that the claimed invention provides unexpectedly superior results over the prior art. The attached Declaration under 37 C.F.R. § 1.132 shows that the present invention provides unexpectedly superior results as compared with applying the coating layer in which toluene described for the laminated film b in Example 7 (page 56 of the specification) is used as the solvent instead of water in the thermoplastic layer in the third laminated film of Example 1. With other solvents

such as ketones and alcohols capable of dissolving the volume layer, there is obviously a similar problem with using toluene referred to in the Declaration as the solvent. Further the comparative Example comprises adhesive layer 5' and 5'' taught by Morii et al '378 and differs from the inventive example only in that the thermoplastic resin layer 4 in the laminated structure of Example 1 is replaced by a toluene solution coating layer. Therefore the attached Declaration is sufficient for comparative experimentation to show unexpectedly superior effects of the claimed invention.

Although it is not specifically disclosed in Example 1 of the present application, the thermoplastic resin layer in the third laminated film is an aqueous solution coating layer of a water-soluble heat-sensitive adhesive (EC1700 made by Chuo Rika Co., Ltd.). This is evident from Example 7 (page 56, lines 10-22 of the specification), wherein the same laminated structure is also prepared. In this regard, it is shown in the attached Declaration that the thermoplastic resin layer 4 of Example 1 is formed by an aqueous solution coating layer.

Applicants further submit that the water-soluble heat-sensitive adhesive (EC1700 made by Chuo Rika Co., Ltd.) is an ethylene-vinyl acetate copolymer, as described in Example 7 (page 56, lines 10-22 of the specification).

The hologram transfer foil obtained in Example 1 is constructed of a laminate structure composed of the "releasable sheet 7/heat seal layer 3/volume hologram layer 2/thermoplastic resin layer 4/surface protective layer 5/substrate 6". The hologram transfer foil (comparative example) described in the declaration differs only in that the thermoplastic resin layer 4 in this laminated structure is replaced by a toluene solution coating layer.

The object of the invention is to provide a solution to an image disturbance problem

with the volume hologram, caused by the migration of the monomer or the like from the volume hologram layer to the thermoplastic resin layer, the passing of the low-molecular-weight components in the thermoplastic resin layer to the volume hologram layer, and the migration of low-molecular-weight components such as surfactants and plasticizers from the surface protective layer into the volume hologram layer via the thermoplastic resin layer.

The example set forth in the declaration comprises the adhesive layers 5' and 5". The declaration shows that the influences on hologram recording are brought about by migration of low-molecular-weight components between the surface protective layer formed by coating as well as the thermoplastic layer and the volume hologram layer and that the thermoplastic resin layer 4 formed by use of the organic solvent does not function as a barrier layer.

Generally, the amount of the solvent remaining in the thermoplastic resin layer and volume hologram layer after drying is only slight, i.e., it is not on a level where there is a concentration gradient enough to cause inter-layer migration. It is the monomer component in the volume hologram layer, and the low-molecular-weight component such as plasticizer and surfactant in the thermoplastic layer or the surface protective layer that contributes to the swelling and contraction of the volume hologram layer. The volume hologram layer contains a large amount of the low-molecular-weight monomer that migrates to the adjacent layer.

When the adjacent layer has a high affinity for the monomer, the monomer component migrates to the adjacent layer according to its concentration gradient with the result that the volume hologram layer contracts and shifts to a shorter wavelength side. In addition, the monomer is an index modulating factor affecting the diffraction efficiency of the monomer.

With the monomer migrating from the volume hologram layer, there is a diffraction efficiency

drop.

The monomer in the volume hologram layer is soluble in organic solvents. In the invention, however, the thermoplastic resin layer is formed using water as the solvent. Accordingly, any migration of the monomer to the thermoplastic resin layer adjacent to the volume hologram layer is prevented with no contraction of the volume hologram layer, even when there is an inter-layer monomer gradient.

Also in the invention, the softening point of the thermoplastic resin layer is made at least 5°C higher than that of the heat seal layer, so the volume hologram transfer foil having high transferability can be obtained. When there is a softening point difference of less than 5°C or the heat seal layer is higher in softening point than the thermoplastic resin layer, a poor transfer/peeling problem arises because the thermoplastic resin layer portion softens upon thermal transfer.

Morii et al '378 teaches that the water-soluble resin is used as the adhesive. However, Morii et al '378 refers only to a plastic film for the surface protective film 7 (column 18, lines 14-22), and says nothing about the surface protective layer formed by coating a surface protective layer-forming ink. Nor does Morii et al '378 mention anything about the softening point difference between the adhesive layers 5' and 5". Thus Mori et al '378 does not teach or suggest the claimed invention.

Neither of of Van Gert et al and Smothers et al cures the deficiencies of Morii et al '378. Van Geert et al refers to the so-called "relief type" hologram that comprises an embossed layer covered with a metal layer (page 1, lines 14-15), and is silent about the influence the migration of the low-molecular-weight component has on volume hologram

recording. Smothers et al discloses an invention relating to a hologram modulated film for modulation of volume hologram recording, but does not refer to the provision of the barrier layer to ensure that the migration of the low-molecular-weight component has no influence on volume hologram recording. Thus, one of ordinary skill in the art would not have been motivated to combine the references as suggested by the Examiner with a reasonable expectation of success in achieving the claimed invention. Further, the presently claimed invention provides unexpectedly superior results over the prior art as evidenced by the attached Declaration. Accordingly, the claimed invention is not rendered obvious over the cited references.

In view of the above, Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 103.

II. Conclusion

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

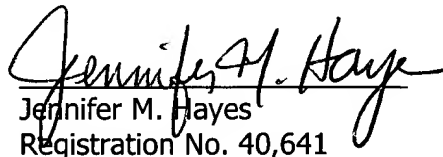
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